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(19) (CA) **APPLICATION FOR CANADIAN PATENT** (12)

(54) Menu System

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Menu System

Field of the Invention

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The present invention pertains to menu systems and more particularly to a user definable menu.

Background of the Invention

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As radio communication devices become more complex, including more features, it has become increasingly difficult to provide a user-friendly interface which does not substantially hinder the user's ability to access features. One man machine interface that has been adopted is a menu system wherein menu items are displayed sequentially on screens. The user employs a keypad associated with a menu control processor to move through the menu items.

Although menu systems are relatively easy for users to utilize, they have some disadvantages. Menus are long, often requiring that the user scroll through an extensive number of items before finding a particular item that they wish to use.

Accordingly, it is desirable to provide an improved menu system.

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Brief Description of the Drawings

FIG. 1 is a front and side perspective view illustrating a radio telephone;

FIG. 2 is an enlarged view illustrating the keypad of the radio telephone according to FIG. 1;

FIG. 3 is a circuit schematic in block diagram form illustrating a circuit in the radio telephone according to FIG. 1;

FIG. 4 is a chart illustrating a catalog of features of a menu system;

FIGs. 5, 6, 7, 8, 9, 10, 11, and 12 are charts illustrating menus and items within the menu system of FIG. 4;

FIG. 13, 14, 15, 16, 17, 18, 19 and 20 are flow charts illustrating the operation of the menu system;

5 FIG. 21 is a chart illustrating a volume and vibrator control;

FIG. 22 is a chart illustrating an alternate volume and vibrator control; and

FIG. 23 is a chart illustrating another call alert control.

10 Detailed Description of the Drawings

A portable device includes a display which displays menu information. The menu information includes a plurality of screens which are sequentially displayed in a user definable order.

15 The invention is illustrated in radio telephone 100. Radio telephone 100 is a GSM Cellular Telephone utilized with a smart memory card 102. However, the menu system is applicable to other radio communication device, such as personal communicators, pagers, two-way radios, cordless telephones, and the like. Additionally, as used
20 herein radio telephones refer to portable, cellular, and cordless telephones. Those skilled in the art will also recognize that the invention may be advantageously employed in landline telephones. Accordingly, as used herein, "device" refers to all such equipment and their equivalence.

25 A radio telephone 100 (FIG. 1) includes a body 102. A keypad, or keyset 106 and a display 108, are positioned on the front face 110 of housing 102. The illustrated radio telephone includes a slot 107 for receipt of a smart card 105 used by radio telephone 100 to communicate with base site transceiver 103. However, the cellular telephone could
30 be of the type which does not employ a smart card. A volume up button 124 and volume down button 126 are positioned on the side 128 of radio telephone housing 102.

The keyset 106 (FIG. 2) includes an OK key 212, a clear key 214, a menu key 216, an arrow right 218, and an arrow left key 220. The keyset

also includes a power key 222, single button function keys 224 and 226, and a hang-up key 228.

The keyset 106, including the volume up and volume down keys, is connected to a processor 320 (FIG. 3) through a data bus 322.

5 The controller may be implemented using a suitable commercially available microprocessor such as a Motorola HC11 or MC68332 or the like. The controller is connected to display 108 through a databus 324. The controller is also coupled through a bi-directional databus 330 to a memory 332. The memory 332 is a dynamic memory storing the user
10 definable menu, and may be implemented using any suitable memory device such as a commercially available electronically erasable programmable read-only memory (EEPROM), a battery backed-up random access memory (RAM), or the like. The processor is coupled to transceiver 334 through a signal bus 336.

15 In operation, controller 320 is responsive to input signals from the keyset 106 to selectively move through menu screens, represented by boxes in FIG. 4. Each screen shows a single menu item in the illustration of FIG. 4 due to the compact size of screen 108 (FIG. 1). However, it is envisioned that screens could display two or more
20 menu items. The screens in FIG. 4 are sequentially displayed on the display 108.

As used herein, a screen refers to the image which may be displayed on display 108 (FIG. 1). If a single screen can not hold a menu item, the single menu item can be scrolled across the display, and the
25 scrolling display of this single item would also be considered a screen for purposes of this patent application.

The main menus of menu system 400 (FIG. 4) includes six heading menu screens 404, 406, 408, 410, 412, and 414. Theses headings are associated with six respective menu screen sequences 415-420 which
30 are not user definable, and extend downwardly therefrom in FIG 4. A user definable menu 421 includes six menu items which are dynamic, as described hereinbelow, such that the user can define the screen sequence of items displayed in this menu. These items are under a menu heading "MY MENU" in heading screen 402. Although this
35 menu includes six items, it is envisioned that the number of items in

the MY MENU could be preset by a user, although it is preferred that the menu have six items to keep the MY MENU display items readily accessible in compact menu.

5 The menu 400 is navigated using the menu key 216 (FIG. 2), the OK key 212 and the direction keys, which are the arrow right key 218 and the arrow left key 220. Upon initial actuation of the menu key, the processor will either display the MY MENU heading screen 402 (FIG. 4), if at least one item is stored in item screens MY MENU 1-6, or the phone book menu heading screen 404, if no items are stored in MY
10 MENU 421. The user presses the arrow right key 218 to circle in a clockwise direction and the arrow left key 220 to circle in a counterclockwise direction. In the clockwise direction, the display 108 (FIG. 1) displays the phone book heading screen 404 (FIG. 4) after the MY MENU heading screen 402, followed by the timer menu heading
15 screen 406, the tone menu heading screen 408, the secure menu heading screen 410, the option menu heading screen 412, the message menu heading screen 414, and then the MY MENU heading screen 402 again. If the arrow left key is pressed, the MY MENU heading screen 402 will be followed by the message menu heading screen 414, the
20 option menu heading screen 412, the secure menu heading 410, the tone menu heading screen 408, the time menu key screen 406, the phone book heading screen 404, and the MY MENU heading screen 402, each of which is sequentially displayed in display 108 each time the arrow left key is actuated. The arrow left key thus allows the sequence
25 to progress in one direction through the menu system headings and the arrow right key allows the progression to be in the opposite direction through the menu system headings.

When a menu heading screen is displayed, such as the timer menu heading screen 406 (FIG. 4), the user actuates the OK key 212
30 (FIG. 2) to move into that menu. Thus, the budget meter screen would be displayed following actuation of the OK key from the timer prompt heading menu screen in FIG. 4. Once in the timer menu, the user actuates the arrow right key to move down the timer menu screen sequence. Thus, the arrow right key will cause the menu item screen
35 sequence to be the sequence timer options screen, to the review timers

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screen, to the review units screen, to the reset timer screen, the one minute timer off screen, the exit to menu screen, and back to the budget meter screen. Conversely, the user actuates the arrow left key to move from the budget meter screen, the exit to menu screen, the one
5 minute timer off screen, the reset timers screen, the review units screen, the review timer screen, the timer options screen, and the budget meter screen.

The user may return to the MY MENU screen 402 at any time by pushing menu key 216. Additionally, the user can return to the menu
10 heading screen by actuating the OK key when the exit to menu screen of the menu is displayed.

Movement through the menus has been generally described with respect to FIG. 4. Specific menu item screens, and their associated screens, are illustrated in FIGs. 5-12. FIG. 5 illustrates the phone book
15 menu 415 screen sequence. The phone book menu includes the recall by name screen 502, and the screens associated therewith. This item allows the user to recall stored telephone numbers by identifying the name of the person to be called. The recall by location item screen 504 allows the user to recall telephone number by location. The store
20 number item screen 506, and associated screens, are illustrated in FIG. 6. This item allows the user to store a telephone number in memory. The edit menu item screen 508 allows editing of stored numbers. The my number item screen 510 allows the user to enter their own phone number. The exit to menus screen 512 returns to the phone book
25 menu heading screen when the OK key is actuated while screen 512 is displayed.

The timer menu 416 is illustrated in FIG. 7. The timer menu includes a budget meter screen 702, timer options item screen 704 with associated screens extending to the left thereof, a review timer screen
30 706 with associated screens, a review unit screen 708 with associated screens, a reset timer screen 710 with associated screens, and a one minute timer off screen 712. The review timer item allows the user to keep track of calls in individual, resetable, cumulative, home and roam billing based on time of usage. The review units item allows the user
35 to review the number of units in the individual, resetable, cumulative

home, and roam. The reset timer is used to set the timer. The one minute timer off enables or disables a one minute timer. The exit to menus is selected using the OK key to return to the main timer menu heading screen 406.

5 FIG. 8 illustrates the tone menu 417. The tone menu includes a ring or vibrator select menu item screen 802 with associated screens extending to the left. This allows the user to select vibrate only, ring only, ring and vibrate, visual alert only and exit to menu. The ringer style menu item screen 804 and associated screens is used to select a
10 particular ring style. The keypad tone on item screen 806 enables an audible tone each time the keypad is actuated. The scrapped tone item screen 808 is similarly used to provides an audible response to user actuation. The exit to menu site screen 810 is used to return to the main tone heading screen 408.

15 The secure menu 418 (FIG. 9) provides security features for the radiotelephone 100 (FIG. 1). This includes a lock menu item screen 902 which is used enable and disable the radiotelephone lock. The secure options item screen 904 and associated screens extending to the right thereof in FIG. 9 include security levels. The exit to menus item screen
20 906 is used with the OK key to return to main secure menu heading screen 410.

 The option menu 419 (FIG. 10) provides the user with options as indicated in screens 1002-1006 in FIG. 10. The status review item screen 1004, and associated screens, are illustrated in FIG. 11. The message
25 menu 420, including a pop-up message screen 1202, is illustrated in FIG. 12.

 The operation of the menuing system will now be described with respect to Figs. 13 through 20. The menu system is provided by processor 320 (FIG. 3), display 108, keyset 106 and memory 332. Upon
30 power up of the radiotelephone 100, the processor 320 is initialized as indicated in block 1300. If the menu key 216 (FIG. 2) is actuated, as determined in block 1302 (FIG. 13), the processor will proceed to perform non-menu operations, as indicated in block 1304. Until such time as the menu key is actuated, the processor will perform non-
35 menu operations. When the menu key 216 is actuated, the processor

determines whether any menu item screens from the phone book menu 415 (FIG. 4), time menu 416, tone menu 417, secure menu 418, options menu 419, or message menu 414, are stored in MY MENU 421. If the processor determines that no menu item screens are stored in the MY MENU 421, as indicated in decision block 1306, the processor proceeds to block 1308 to display the first main menu heading screen, i.e. the phone book menu screen 404. MY MENU 402 then becomes the "last" menu screen displayed when progressing to the right using the arrow right key. The processor will then proceed to the operations described in FIG. 15, as described in greater detail herein below. If at least one of item screens MY MENU 1-6 of the MY MENU 412 has a menu item screen copied therein, the program will proceed to block 1400 in FIG. 14.

The processor 320 (FIG. 3) controls display 108 to display MY MENU screen as indicated in block 1400 (FIG. 14). If the user does not press the OK key, as determined in decision block 1402, or a direction key (arrow right key or arrow left key), as indicated in decision block 1404, the processor will continue to display MY MENU heading screen 402. If the user selects the OK key, as determined in decision block 1402, the processor will set N equal to one, as indicated in block 1406. N is associated with the menu items, labeled 1 through 6, as shown in FIG. 4. The processor will then continue to block 1408, to display the menu item screen "MY MENU N" (where N is one at this point. The processor determines whether a direction key is pressed in decision block 1410. If a direction key is pressed, the processor determines if it's a right arrow key in decision block 1412. If it is the right arrow key, the menu item number N is increased by one, as indicated block 1414. If increasing the menu item by one causes the menu item to be greater than six, the menu item N is set equal to one. This allows the screen sequence to go from screen item MY MENU 6 to screen item MY MENU 1, when progressing using the arrow right key.

If the MY MENU 6 is followed by the "Exit to Menu" screen, as indicated in FIG. 4, the processor will control the display to display the MY MENU heading screen 402 following actuation of the OK key. Alternatively, the user may use the arrow right key to progress to item

screen MY MENU 1 or the arrow left key to move back to item screen MY MENU 6. The processor will return to block 1408 if the user does not opt to return to the MY MENU heading.

5 If it is determined in decision block 1412 that the right arrow key was not actuated, the processor decreases N by one, as indicated in block 1416. If the result of decreasing N in block 1416 is less than one, the processor sets N equal to 6. Again, if the exit to menu item screen is provided in the sequence of screens, as indicated in FIG. 4, the user may press the OK key while the Exit to Menu message is displayed to return to the MY MENU screen 402. Scrolling right from the exit to menus screen would return the user to item screen MY MENU 1 whereas scroll left would return the user to item screen MY MENU 6. The exit to menu provides the user with the means to return to the main menu after scrolling through the menu. The user may also return to the MY MENU heading at any time while in the menu system by actuating the menu key 216. Thus, the menu key provides a ready return to the main menu, and the exit to menu options provides a means of informing the user that they have the option to return to the menu heading. This facilitates the user screen sequence progression through the menu for users who do not have ready access to a manual and do not remember the scrolling method.

15 If it is determined in decision block 1410 that the direction key is not actuated, the processor determines whether the OK key was actuated in decision block 1418. If the OK key was actuated, the processor displays the message "program item N", and the number N flashes, as indicated in block 1420. Thus, if the user was on menu item 1 when the OK key was actuated, the number 1 will flash while the user looks for a menu item screen to transfer to the MY MENU 421. The processor will then proceed to the programming routine described with reference to Figs. 16, 17 and 18. If it was determined in decision block 1418 that the OK key was not actuated, the processor determines whether the clear key is actuated in decision block 1422. If the clear key was not actuated, the processor will return to decision block 1410, and continue to wait for actuation of a direction key, the OK key or the clear key. If the clear key is determined to have been actuated in decision

block 1422, the processor displays the message "clear menu location N" as indicated in block 1424. This informs the user that they have the option of clearing the item stored in item screen MY MENU N which is currently displayed. If the user presses the clear key, as determined
5 in decision block 1426, the processor returns to display the menu item at block 1408. If the clear key was not determined to have been actuated in decision block 1426, the processor determines whether the OK key is actuated in decision block 1428. Actuation of the OK key confirms that the user wishes to clear the menu location. Actuation of the OK key
10 will control the processor to display the message "MY MENU location N", indicating that no item is stored at menu location N, as indicated in block 1430. If the OK key was not actuated as determined in decision block 1428, the processor returns to block 1426 and waits for the clear key or OK key to be actuated.

15 Scrolling through the menu will now be described with respect to FIG. 15. Initially, the processor has entered the scrolling mode following actuation of one of the direction keys. The processor first determines whether the right arrow key was pressed in decision block 1500. If the right arrow key was actuated, the processor will move
20 clockwise through the main display screen sequence as indicated in block 1502. If the right arrow key was not pressed, indicating that the left arrow key was actuated, the processor progress through the screen sequence of FIG. 4 in a counterclockwise direction, as indicated in block 1504. Following movement to the new item screen, the processor waits
25 for the OK key to be actuated, as detected in decision block 1506, or a direction key to be actuated, as detected in block 1508. If the OK key is actuated, indicating that the user has entered the menu under the main menu heading, the processor will display the menu item as indicated in block 1509. If the OK key is detected in decision block 1510,
30 indicating that the user wishes to enter the menu item, the processor will move into the menu item screen sequence, or toggle a menu item having two states, as indicated in block 1512. When in the menu item, the user may use the menu item as instructed by the menu. Use of the menu could include entering a telephone number, recalling a
35 telephone number, selecting a security level, or any of the other items

under the main menu headings 404 through 414. Inasmuch as the specific menu item operations are not a part of the immediate invention, these items are not described in greater detail herein.

5 If it is determined in decision block 1510 that the OK key is not actuated, the processor determines whether a direction key was actuated in decision block 1513. If the left or right arrow keys are actuated, the processor will determine which key was actuated in decision block 1514. If the right arrow key was actuated, the processor will move clockwise through the menu items under the main menu heading, as indicated in block 1516. If the arrow left key was actuated, 10 the processor will move counter clockwise through the menu item sequence, represented in FIG. 4, under the main menu heading, as indicated in block 1518. If the menu item exit screen is not displayed, as determined at decision block 1520, the processor will return to decision block 1510. If it is determined at decision block 1520 that the menu 15 item exit screen is displayed, the processor will determine whether the OK key is actuated, in decision block 1522. Actuation of the OK key when the menu item exit screen is displayed will cause the processor to display the main menu heading, as indicated in block 1524 and return to block 1506. If the OK key was not determined to have been actuated in decision block 1522, the processor determines whether a direction key is actuated, in decision block 1526. If the direction key is not actuated, the processor will wait for the OK key or the direction key to be actuated. If it is determined at block 1524 that the direction key is 20 actuated, the processor will return to block 1514 to continue progressing through the screen sequence under in the selected menu.

The copying or defining mode, which is the copying of item screens from the menus 415-421 to MY MENU 421 locations, will now be described with reference to FIGs. 16 through 18. Initially, the 30 processor determines whether the menu key is actuated in decision block 1600. If the menu key is actuated, the processor will move to the main menu, represented by block 1700 in FIG. 17. If the menu key is not actuated as determined in decision block 1600, the processor will determine whether the OK key is actuated in decision block 1602. If the 35 OK key is actuated, the processor will display the message "copied to

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MY MENU item n", as indicated in block 1605. The processor then waits for actuation of any key, as determined in decision block 1606, to return to decision block 1602.

5 If the OK key is not actuated, as detected in decision block 1602, the processor determines whether a direction key was actuated in decision block 1604. If the decision key is not actuated, the processor returns to block 1600. If the direction key is actuated, the processor determines whether the right arrow key was actuated in decision block 1606. If the right arrow key was actuated, the processor scrolls clockwise
10 to the next menu item screen in the MY MENU as indicated in decision block 1608. If the right arrow key was not actuated, the processor scrolls counterclockwise to the previous MY MENU item screen as is indicated in decision block 1610. Following blocks 1608 and 1610, the processor determines whether the OK key was actuated in
15 decision block 1612. If the OK key is not actuated, the processor returns to block 1600. If the OK key was actuated, the processor displays "copy MY MENU location N" as indicated in block 1614. This informs the user that the user has the option of copying the menu item screen in another location of the MY MENU to the MY MENU location currently
20 being defined. If the user actuates the OK key, as determined in decision block 1616, the item is copied from the old location to the menu location currently displayed, as indicated in block 1618. The processor then moves to the MY MENU location being programmed as indicated in block 1620, displays the current menu screen, and returns
25 to block 1408 in FIG. 14.

If the OK key is not actuated, as determined in decision block 1616, the processor determines whether the clear key is actuated in decision block 1622, or if the direction key is actuated in decision block 1624. The processor will wait for the OK key, the clear key, or a
30 direction key to be actuated. Upon actuation of the clear key, the processor will return to decision block 1612. Upon actuation of a direction key, as determined in decision block 1624, the processor will return to decision block 1607 to continue movement through the MY MENU. Thus, in summary, FIG. 16 represents movement through the
35 MY MENU in the copying or defining mode, and copying of item

5 screens from one MY MENU location to another MY MENU location. It should be noted that following such copying of items in the MY MENU, the item will appear in two MY MENU locations. The ability to copy one items within the MY MENU location to another allows the user to manually relocate item screens in the MY MENU according to their use, as the user changes their use thereof.

10 If the user actuates the menu button while in the copying mode, the processor will move to the main menu headings as indicated in block 1700 (FIG. 17). The processor will determine if a direction key is actuated in decision block 1702 or the OK key is actuated in decision block 1704. Actuation of a right or left arrow key moves the processor through the main headings. Thus, if the processor detects a right arrow key as determined in decision block 1706, the processor will move to the next clockwise menu heading and display it as indicated in block 15 1707. If the processor does not detect the right arrow key in decision block 1706, indicating that the left arrow key was actuated, the processor moves to the next counterclockwise menu heading screen, and displays this information in display 108 as indicated in block 1708. The processor then returns to decision block 1702.

20 If it is determined in decision block 1704 that the OK key is actuated, indicating that the user wishes to enter the menu under the menu heading, the processor displays the first menu item as indicated in block 1710. According to an advantageous aspect of the invention, the MY MENU item number being defined, i.e. 1, 2, 3, 4, 5, or 6, will be displayed throughout the programming process and it will flash so 25 long as the user is looking for an item to be copied into the MY MENU.

In decision block 1712, the processor determines whether the OK key is actuated. If the processor determines that the OK key is actuated, indicating that the user wishes to select a menu item for the MY 30 MENU, the processor first determines whether the exit menu options screen is currently displayed, as indicated in decision block 1714. If the menu exit screen is displayed when the OK key is selected, the processor will return to the display menu heading with the MY MENU item number flashing, as indicated in block 1716. If it is determined in 35 block 1714 that the exit menu option was not displayed, indicating that

the user wished to select the item screen for the MY MENU, the processor determines whether the item is a subdirectory heading in decision block 1718. Subdirectory headings, such as timer options in FIG. 7, secure options in FIG. 9, and call options in FIG. 10, cannot be moved to the MY MENU. Most menu item screens may, however, be moved to the MY MENU. Thus, if the item is not a subdirectory heading, the processor will display "copy to MY MENU location N" on display 108, as indicated in block 1720. If the user wishes to copy the item to the MY MENU location N, the user actuates the OK key. The processor detects the OK actuation, in decision block 1722 and displays "copied item to MY MENU location" after copying the item, as indicated in block 1724. The processor then moves to the MY MENU item screen as indicated in block 1726, and returns to block 1408 in FIG. 14. If it is determined at decision block 1722 (FIG. 17) that the OK key is not actuated, the processor determines whether the clear key is actuated in block 1728. If the clear key is actuated, the processor returns to block 1712. If the clear key was not actuated, the processor determines whether a direction key is actuated in decision block 1730. If the direction key is not actuated as determined in decision block 1730, the processor waits for the OK key, the clear key, or the direction key to be actuated. If the direction key was actuated, as determined in decision block 1730, the processor will determine which direction the arrow key was moved in block 1732.

If it was determined in decision block 1712 that the OK key was not actuated, the processor will determine whether the direction key was actuated in decision block 1734. If the direction key was not actuated, the processor will wait for the OK or the direction to be actuated, indicating that the user wished to select or move from the menu item displayed. If it is determined that the direction key was actuated, the processor determines whether the right arrow key was actuated in decision block 1732. If the right arrow key is actuated, the processor will move to the next screen in a clockwise direction in FIG. 4 and display the item, as indicated in block 1738. If the right arrow key was not determined to have been actuated, the processor will move counterclockwise in FIG. 4 to the next menu item screen, and display

the menu item as indicated in block 1740. The processor will then return to block 1712 to determine whether user wishes to select the next menu item.

If it was determined that the decision block 1718 that a
 5 subdirectory heading was selected, the processor will proceed to display the submenu item as indicated at block 1800 (FIG. 18). The processor will then determine whether the OK key was actuated in decision block 1802 or a direction key is actuated in decision block 1804. If a direction
 10 key is actuated, the processor will determine whether the right arrow key was actuated in decision block 1806. If the right arrow key is actuated, the processor will move to the next display screen in a clockwise direction in FIG. 4 to the next submenu item, as indicated in block 1808. If the right arrow key was not determined to have been
 15 counterclockwise menu item screen as indicated in block 1810. Following movement to the next menu item screen, the processor will return to decision block 1802.

If the OK key was actuated in decision block 1802, the processor determines whether the exit to menu screen in a subdirectory heading
 20 was actuated, as determined in block 1812. If the exit menu option was selected, the processor will return to the main menu heading screen as indicated in block 1814. If the exit to menu option was not displayed, as determined at decision block 1812, the processor will display message "copying to MY MENU location N", as indicated in block 1816. The
 25 processor will then wait for actuation of the OK key, to confirm selection of such copying as indicated in block 1818, or the clear key as detected in decision block 1820, indicating that the user does not wish to select the option to be copied to the MY MENU. If the OK key was
 30 actuated, the copied item is displayed in its new my menu location and copied to the displayed location, as indicated in blocks 1821 and 1823. If the clear key is actuated, the processor will return to block 1802 displaying the submenu item. If the clear key is not actuated, the processor will wait for a direction key as detected at block 1822, the OK key as indicated at block 1818, or the clear key as detected at block 1820.
 35 If the direction key is actuated, the block will proceed to block 1806 to

determine which direction is selected, and the processor will continue to progress through the menu screens.

5 The menu system includes a timer interrupt 1901 (FIG. 19), and a timer interrupt 2001 (FIG. 20). While the menuing system is being used, the operator may press the menu key 216 (FIG. 2) at any time to interrupt the program and return the program to the MY MENU, as indicated in block 1900 (FIG. 19). The program will then proceed to block 1402.

10 If the user does not actuate a key for a predetermined time period, for example one minute, the processor detects this inactivity, and interrupts the operation of the program, as indicated at decision block 2000 (FIG. 20). When this one minute of inactivity is detected, the processor will exit the menuing program as indicated in block 2002. Additionally, the user may actuate the on-hook key 228 (FIG. 2) on the
15 keyset to exit the menuing system at any time.

The illustrated MY MENU has a fixed predetermined number of item screens thereunder. This restricts the MY MENU to a short menu which is readily scrolled through and includes the users most preferred items for quick and convenient access. It is envisioned that the items
20 in the MY MENU can be counted each time they are selected by the user. This count can be used to sequence screens according to their use. The most often used items are positioned at the top of the MY MENU and the less often used item screens located at the bottom. Thus the most often used item would be accessed first from the MY MENU heading, the second most used item second, the third most used item
25 third, the fourth most used item fourth and the fifth most used item fifth. Additionally, it is envisioned that the menu system could be set up to operate automatically to move items from the main menu to the MY MENU according to how often they are used. The six most often
30 used items would automatically be moved from the main menus to the MY MENU. Such automatic operation assures the user that the most often used menuing items are in MY MENU. Additionally, it is noted that items in the MY MENU are not removed from the main menu. Thus, these options are accessible when scrolling through the
35 main menu and accessible when scrolling through the MY MENU.

In summary, a menu system is enclosed which includes readily available user definable screen sequence and fixed screen sequence menus. The user definable screen sequence may have a fixed pre-determined length, such as six items. The item screens in the MY
 5 MENU can be automatically or manually selected by the user to include their most often utilized menu items. Additionally, the menuing system allows the user to scroll through menu headings and relatively short menu items under each menu heading. This multi-tiered menu system provides ready access to items that the user wishes to identify.
 10 Additionally, the use of a flashing item number during defining of the MY MENU reminds the user that they are in the copying mode, and which item number in the MY MENU is being selected.

The exit to menus options in each menu allows the user to return to the menu heading screen after entering a menu.
 15 Additionally, the menu key may be utilized to return to the MY MENU heading from any location in the menu.

In the tone menu, the ring or vibrator select item may advantageously include a ring and a vibrate option. This option allows the user to utilize the volume up and volume down keys to set the
 20 volume of the ringer and enable the vibrator in a novel manner. More particularly, FIG. 21 illustrates an eight step volume control. In a ringer only mode, the seven volume levels may be selected by moving from step 2 through step 8. From volume 1, the volume is lowered to activate a silent alert, wherein the ringer is not energized, the vibrator
 25 is not energized and a visual signal is provided as a silent alert. By lowering from step 1 to step 0 using the down volume control, the vibrator is energized. Thus, the two button volume control may be used to select ringer only, vibrator only and silent alert.

FIG. 22 illustrates a mixed mode operation. Volumes 1 through
 30 7, corresponding to steps 2 through 8 set using the up/down volume control buttons, provide increasing volume for mixed mode operation. By moving from step 2 to step 2, pushing the volume control down button, the silent alert is activated, wherein a visual indication of an incoming call only is provided. Lowering the level from step 1 to step

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0 turns on the vibrator such that the user's vibrator will be actuated to provide an incoming call alert.

5 In a third embodiment, the ring only mode has seven volume controls using steps 1 through 7. A silent alert is also provided by selecting step 0 using the volume control.

10 It will be recognized that this novel volume/vibrator control using the volume up and volume down keys, would preferably include displays indicating the volume level 1 through 7, the alert level, step 1, and the vibrator on, step 0, to provide a visual confirmation to the user.

15 Accordingly, it can be seen that an improved radiotelephone interface is disclosed. The system is convenient for users and provides a dynamic menuing system. Program is particularly advantageous because it provides the user with a great deal of versatility and a system that requires sequential display of information due to the relatively small displays available in portable electronic devices such as radiotelephones.

CLAIMS

We claim:

1. A menu system for a portable device, comprising:
a processor;
5 a keypad coupled to the processor;
an alphanumeric display;
wherein the processor includes a plurality of menus including
items displayed in sequential screens on the alphanumeric display, the
processor controlling the display to display the items under the control
10 of user inputs through the keypad, wherein the sequence of screens in at
least a first menu is user definable using the keypad.
2. The menu system as defined in claim 1, wherein the at
least one of the plurality of menus has a fixed predetermined length.
- 15 3. The menu system as defined in claim 1, wherein a second
menu includes a sequence of screens which is not user definable.
4. The menu system as defined in claim 3, wherein screens
20 are selected for the first menu are selected while viewing screens in the
second menu in a copy mode.
5. The menu system as defined in claim 3, wherein the
processor controls the screens to have a flashing image therein while
25 the processor is in the copy mode.
6. The menu system as defined in claim 1, including a
plurality of additional menus which are not user definable, each of the
second and additional menus including a respective heading displayed
30 in sequential screens.
7. The menu system as defined in claim 1, wherein the most
often utilized items are automatically copied from the second menu to
said first menu.

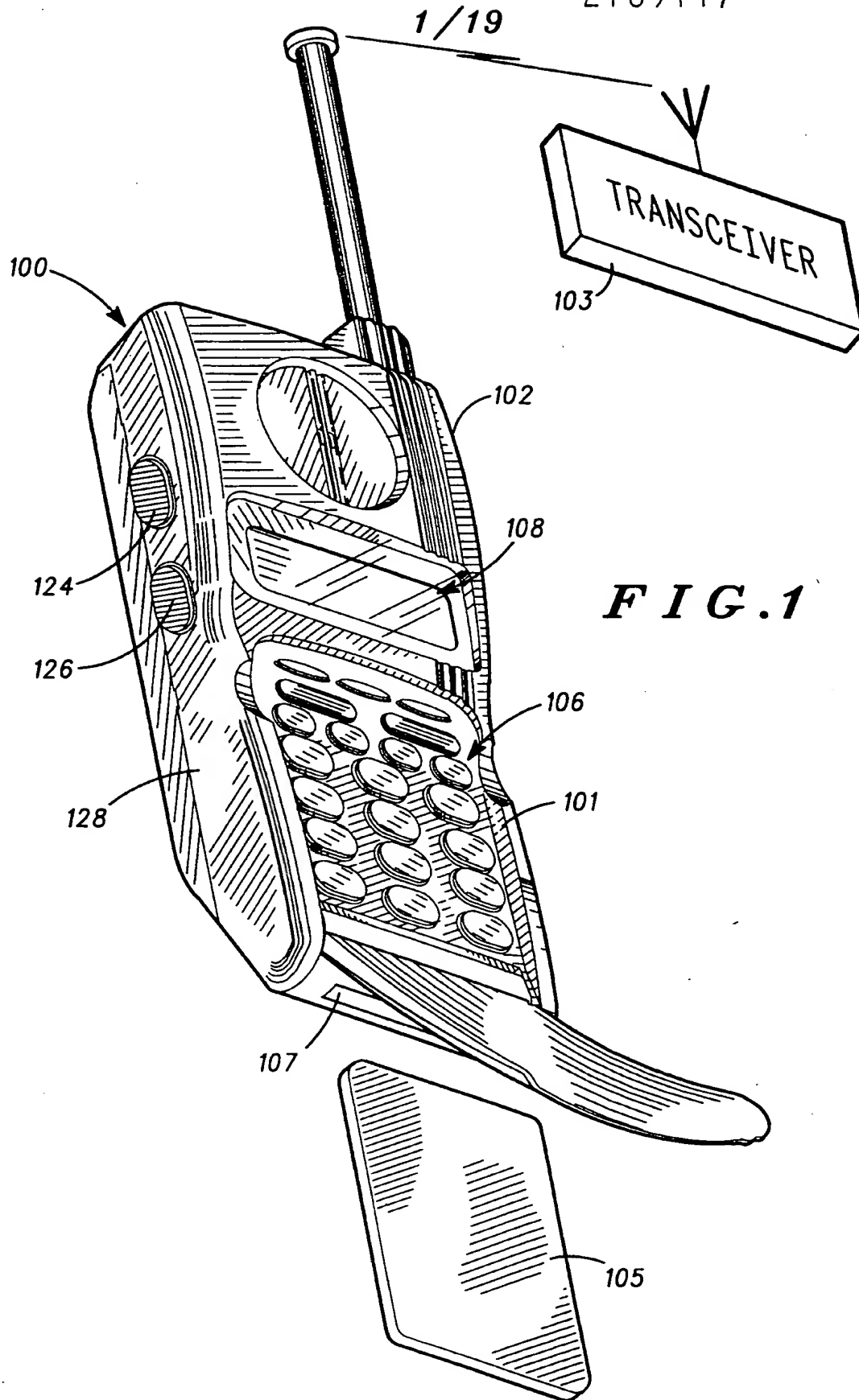
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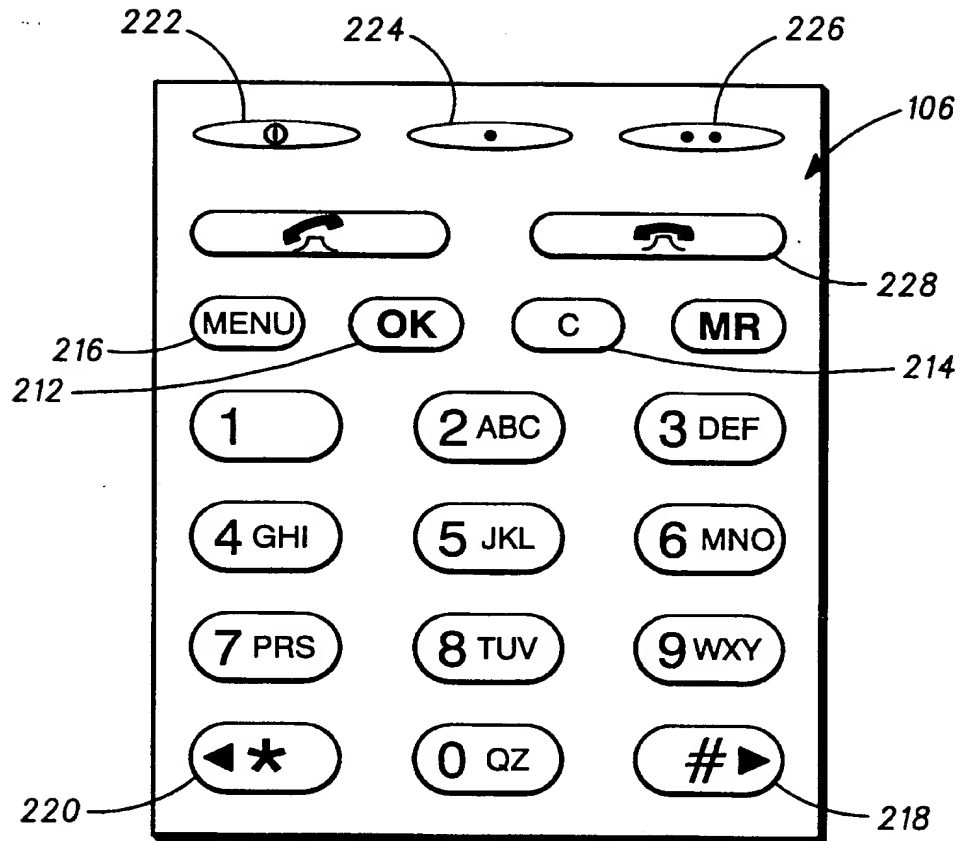
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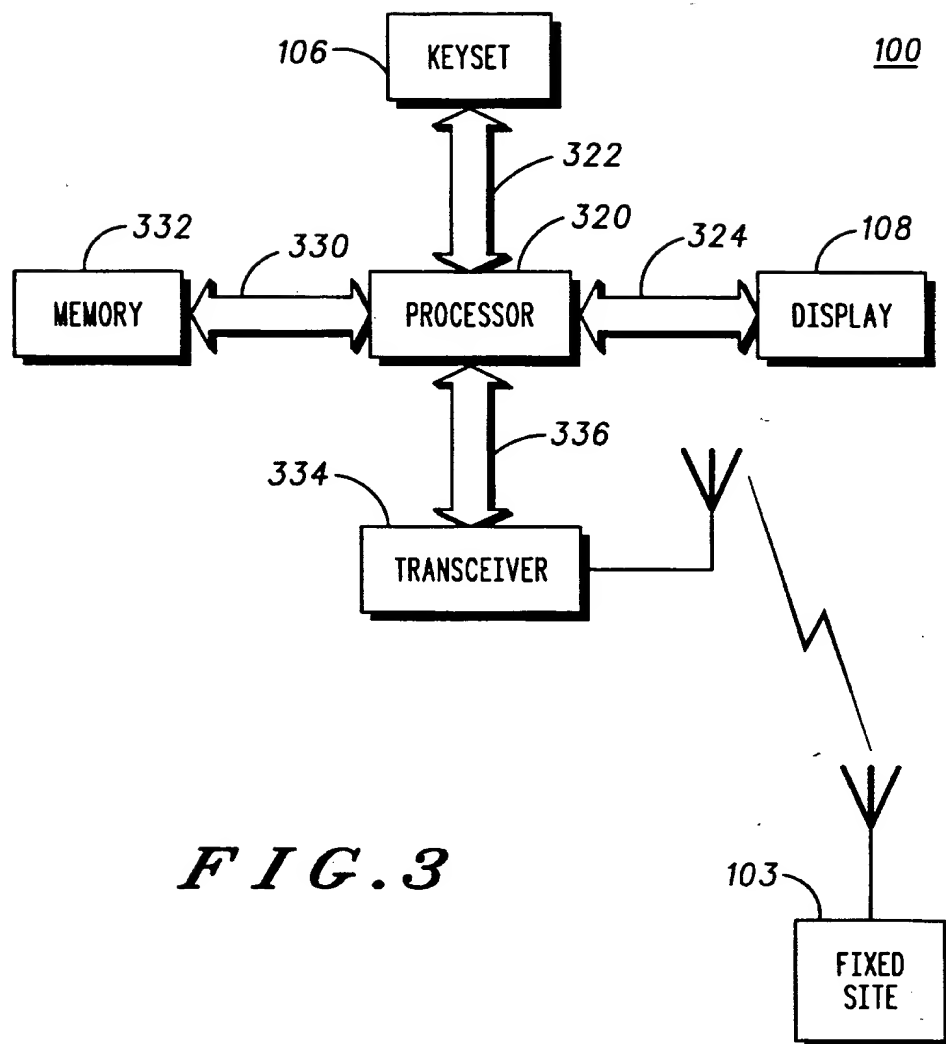
8. The menu system as defined in claim 1, wherein the order that screens are displayed are user definable to control when in the sequence of screens menu items are displayed to the user.

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**FIG. 2**



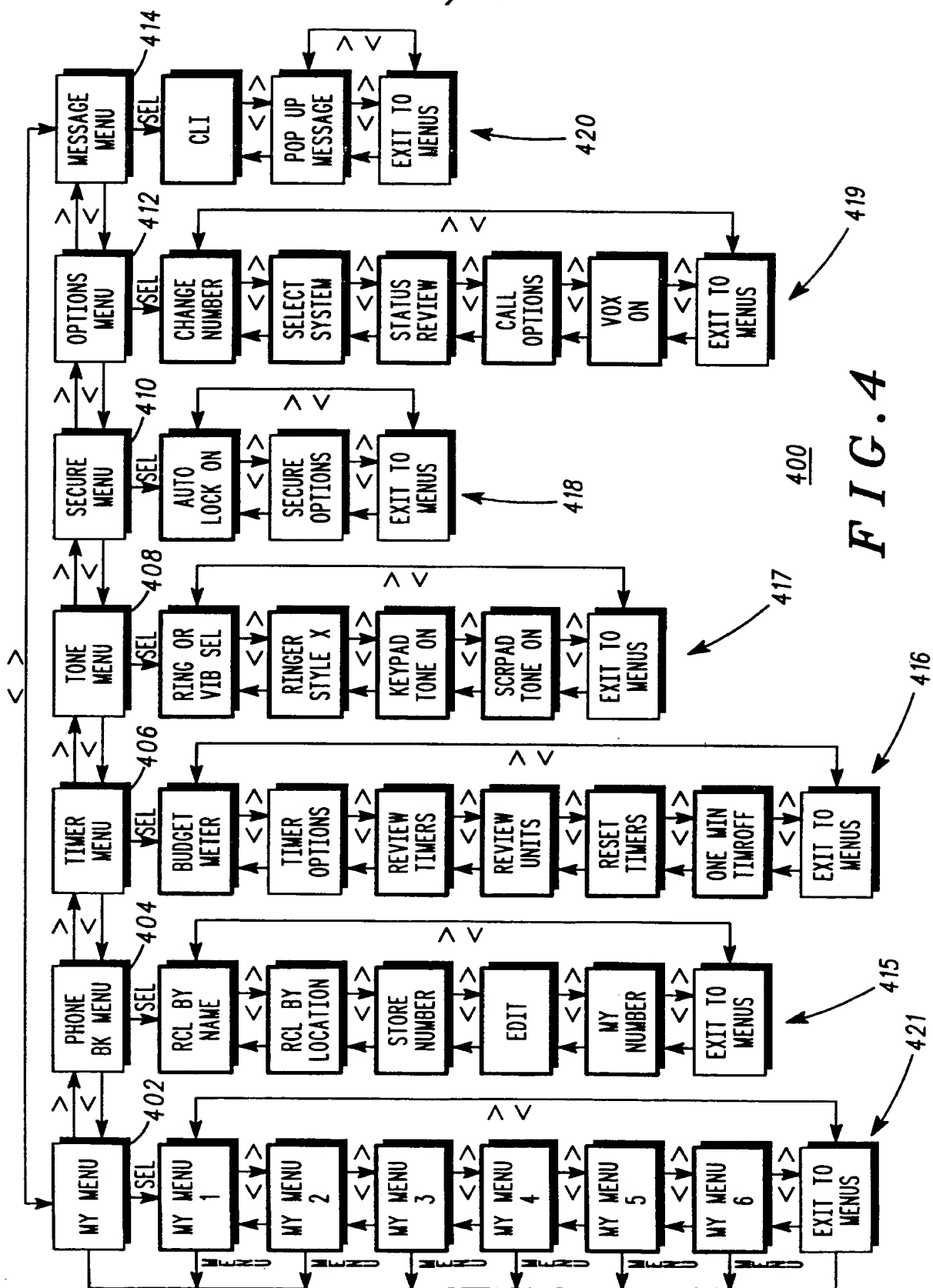
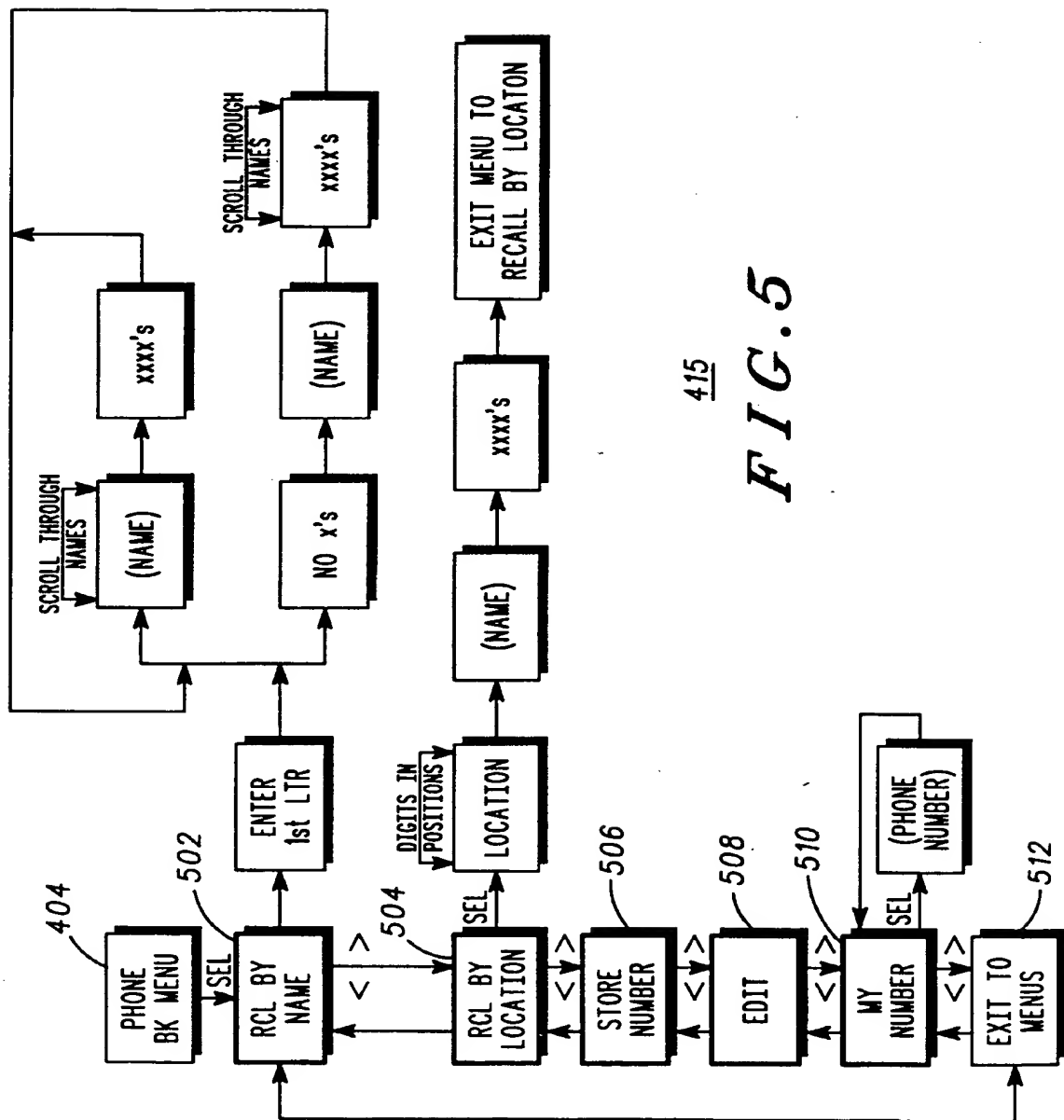


FIG. 4



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FIG. 5

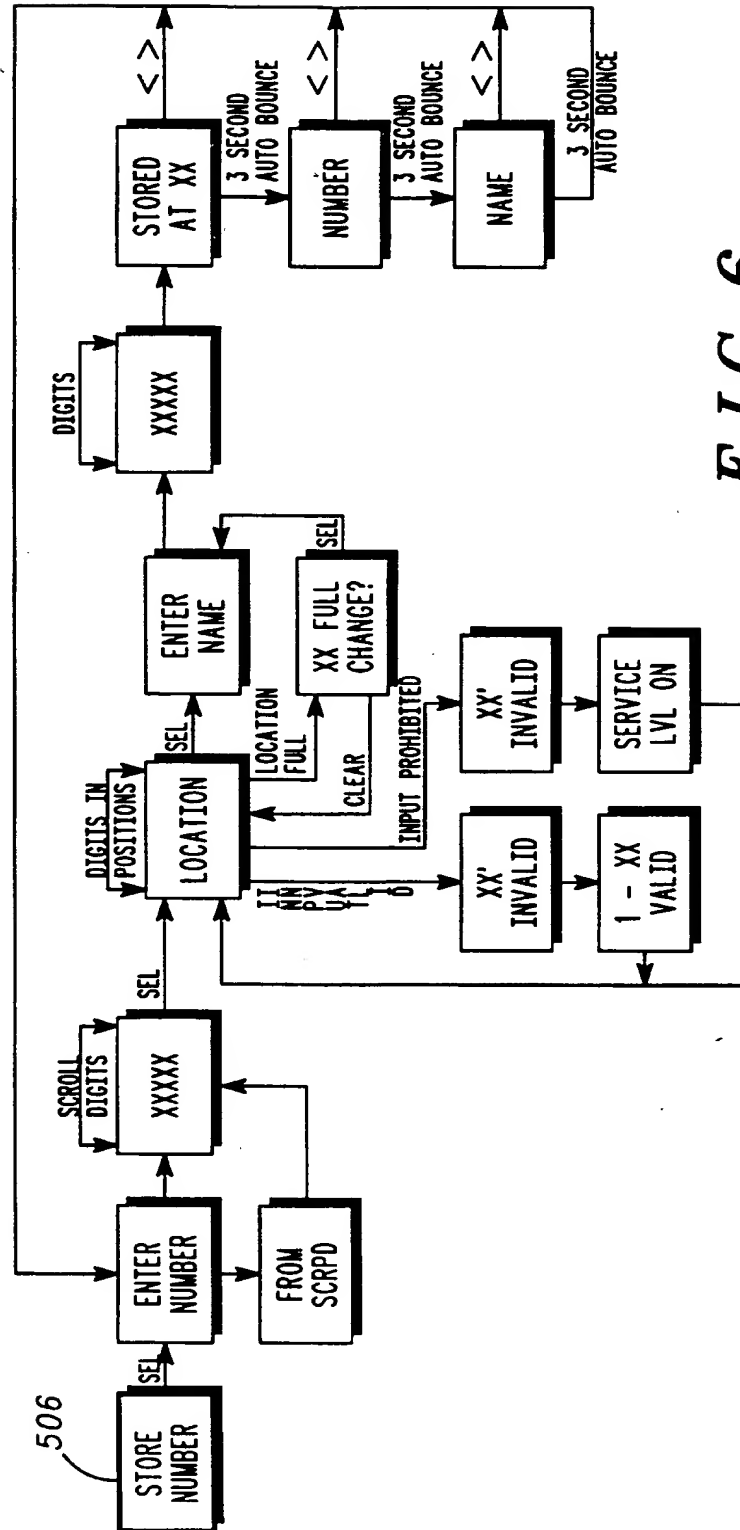


FIG. 6

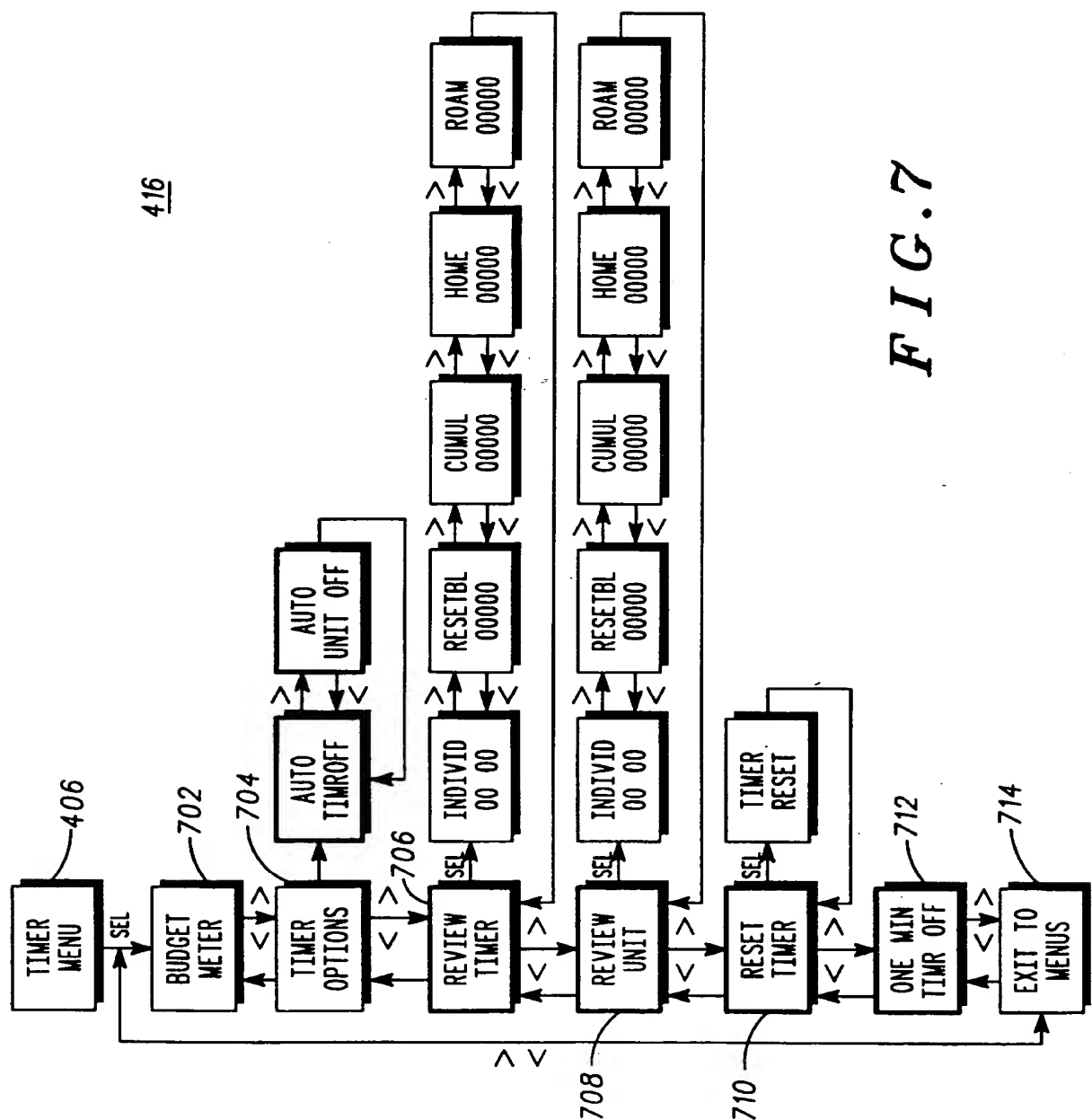


FIG. 7

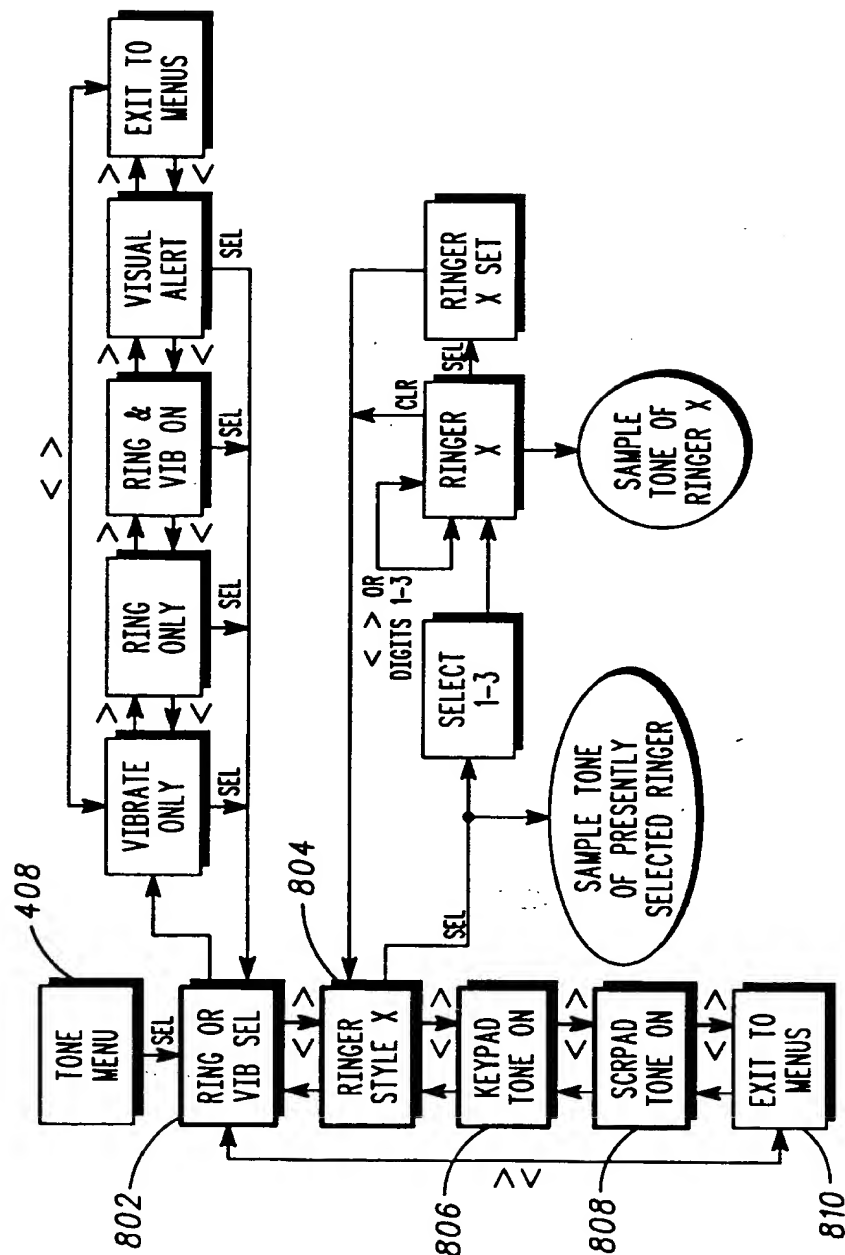


FIG. 8

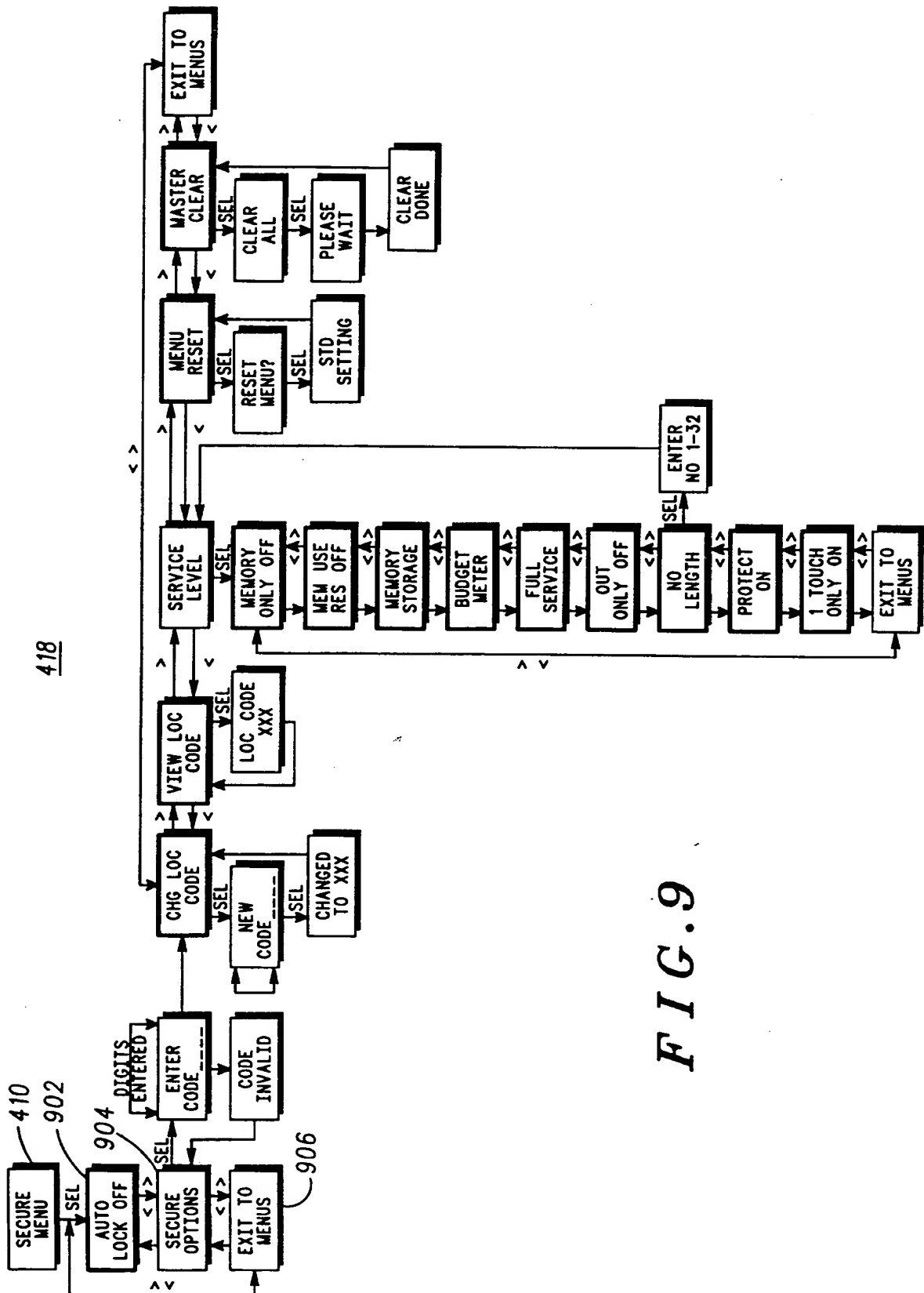


FIG. 9

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FIG. 10

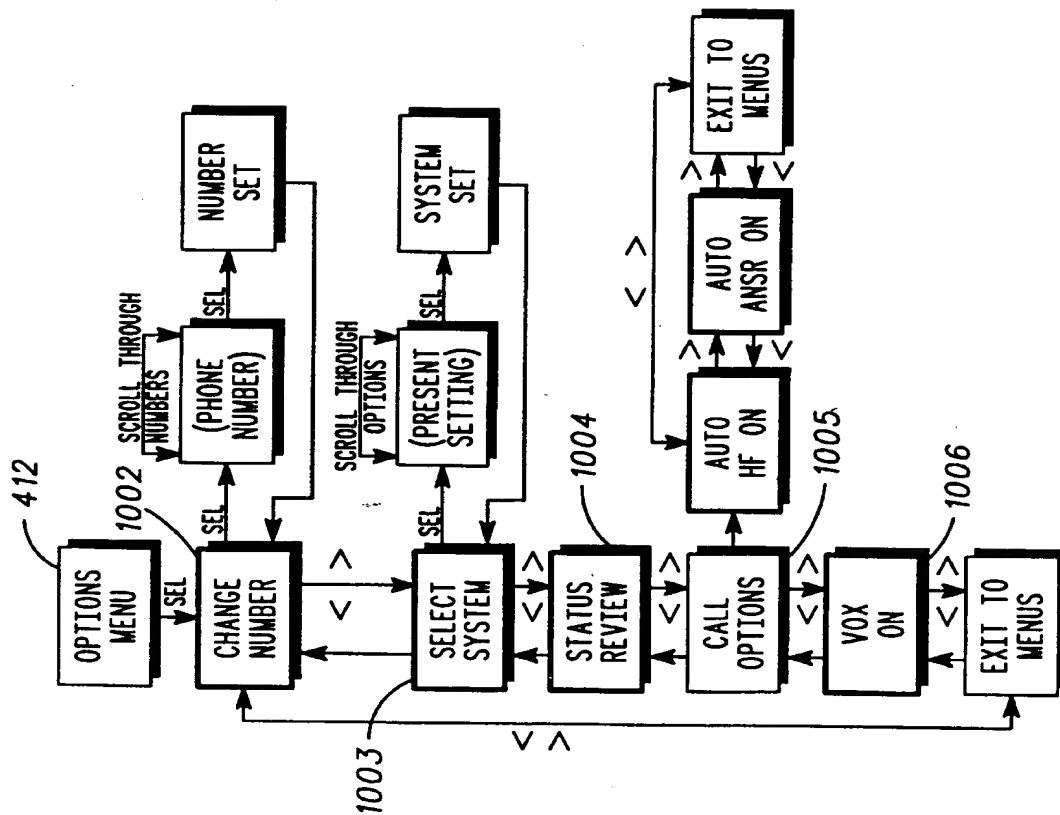
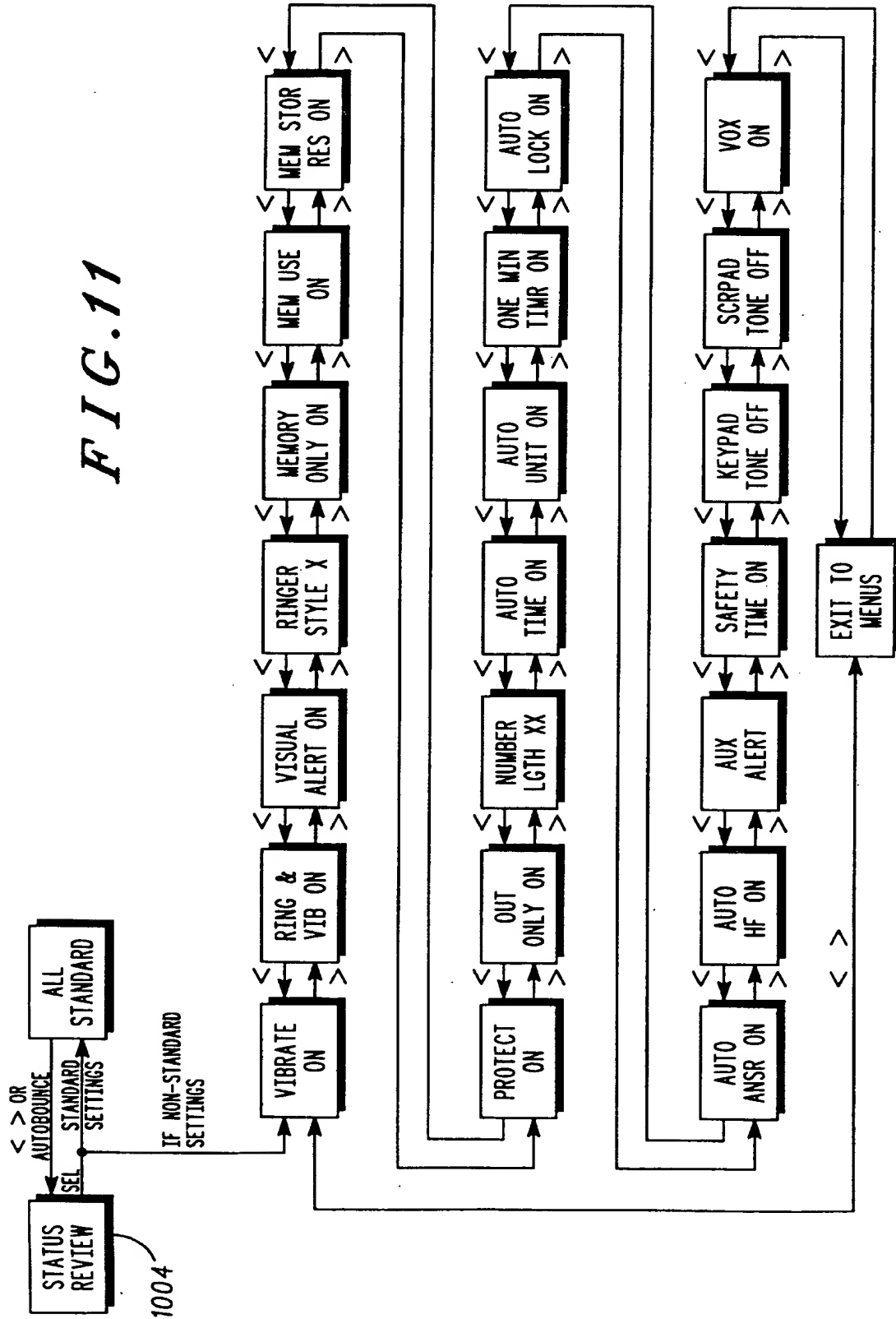


FIG. 11



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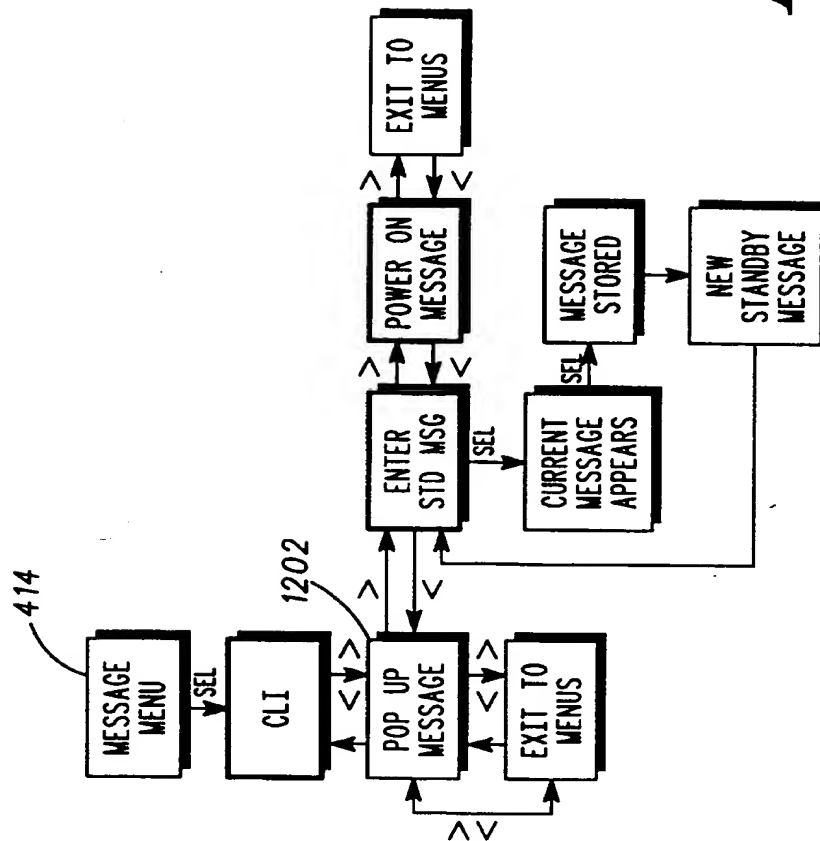
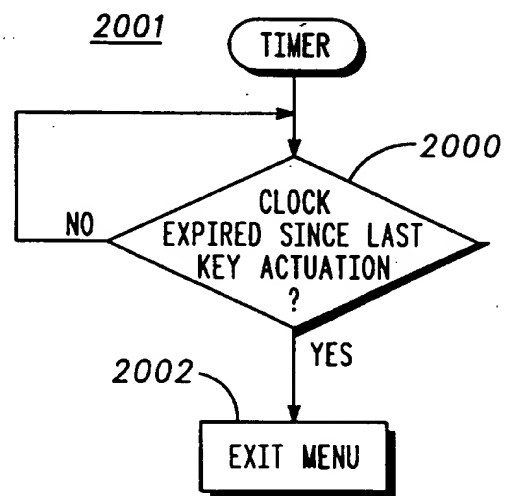
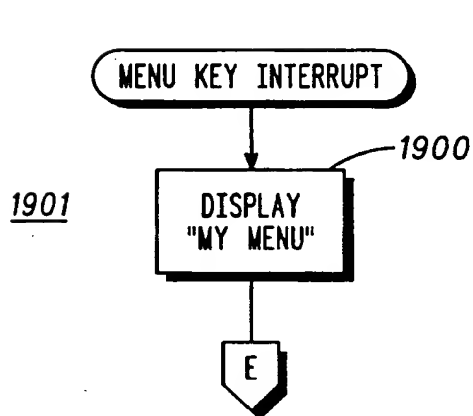
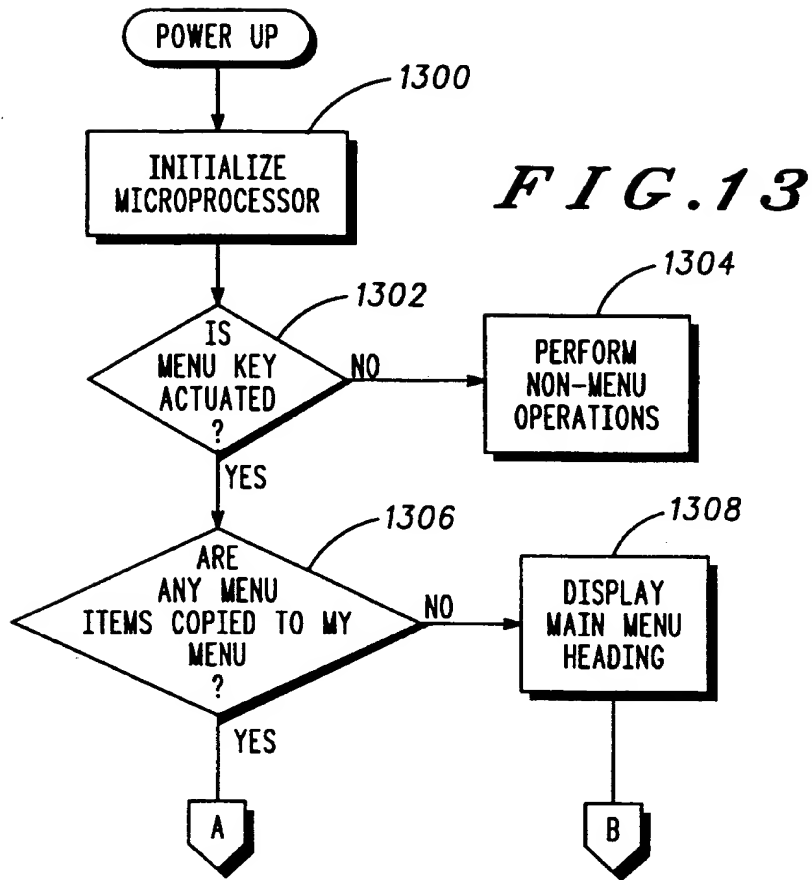


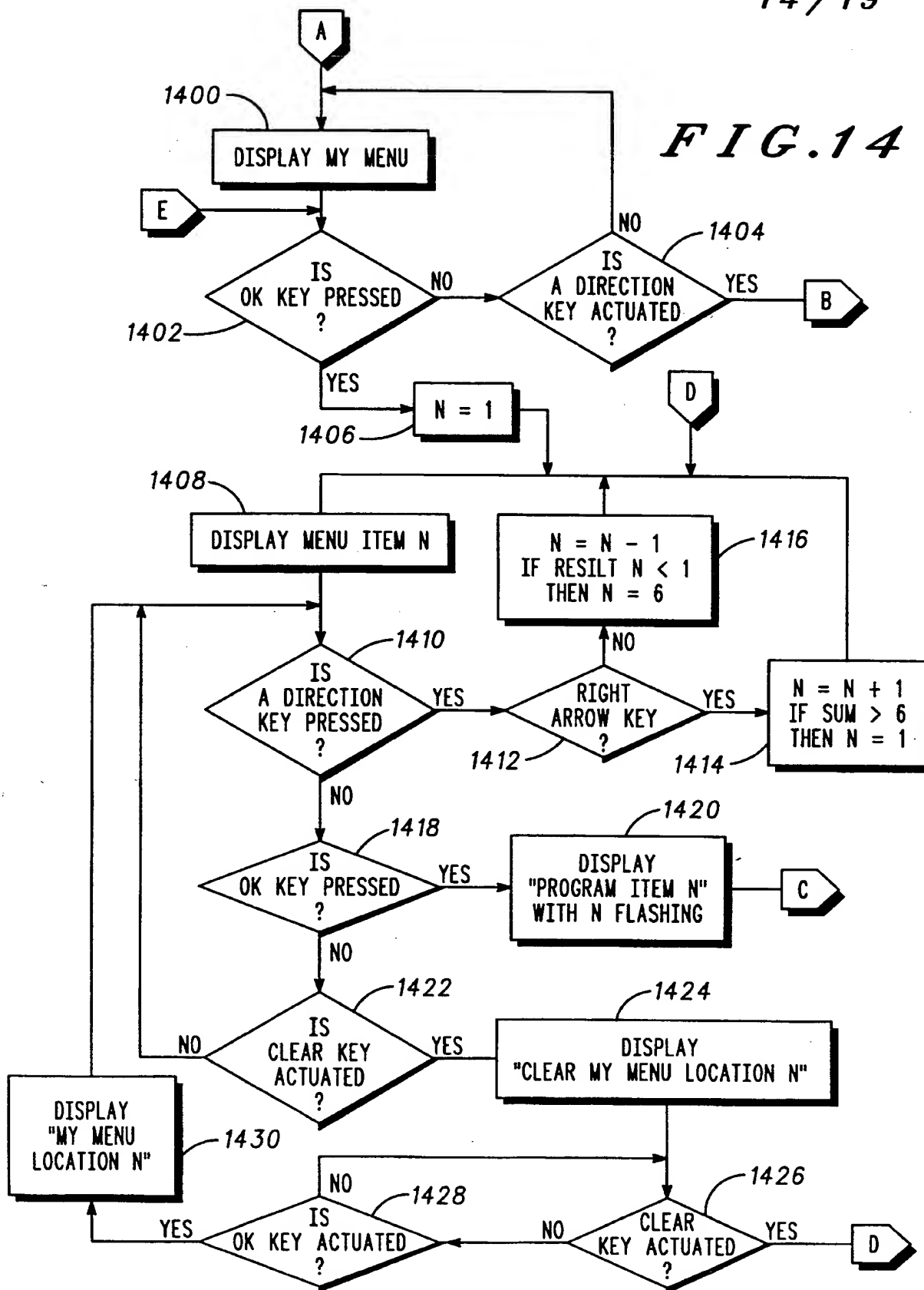
FIG. 12



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FIG. 14



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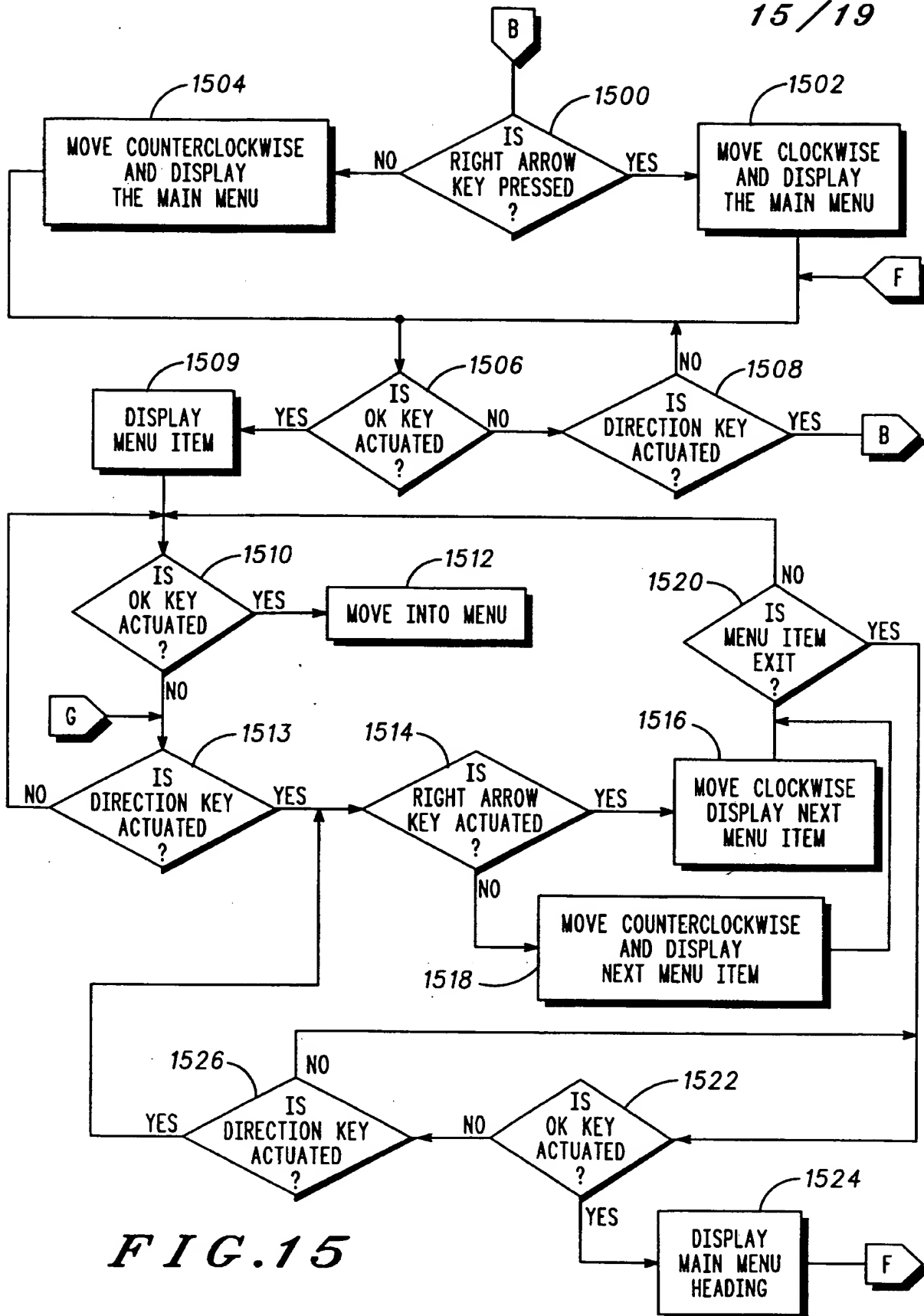


FIG. 15

FIG. 16

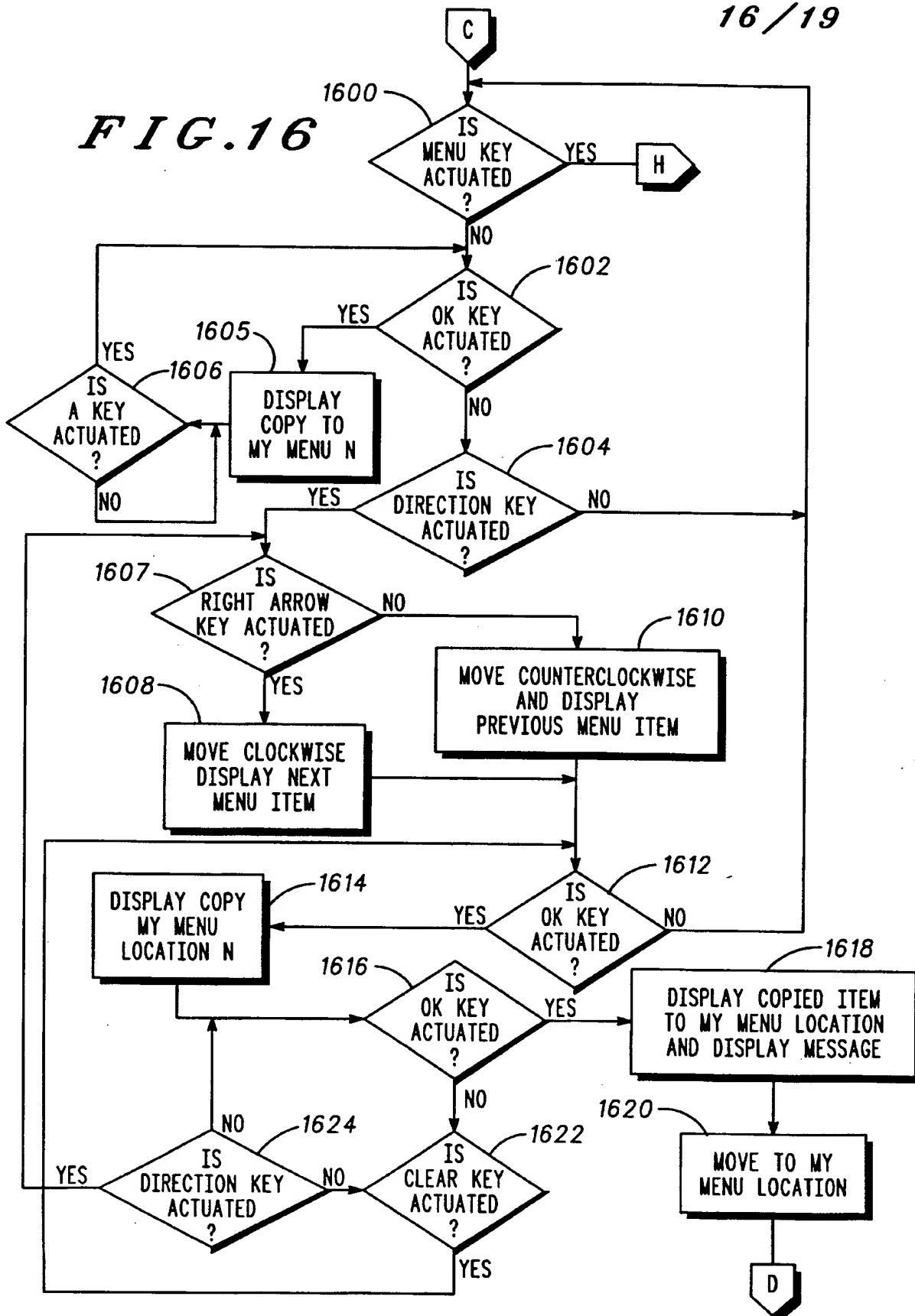


FIG. 17

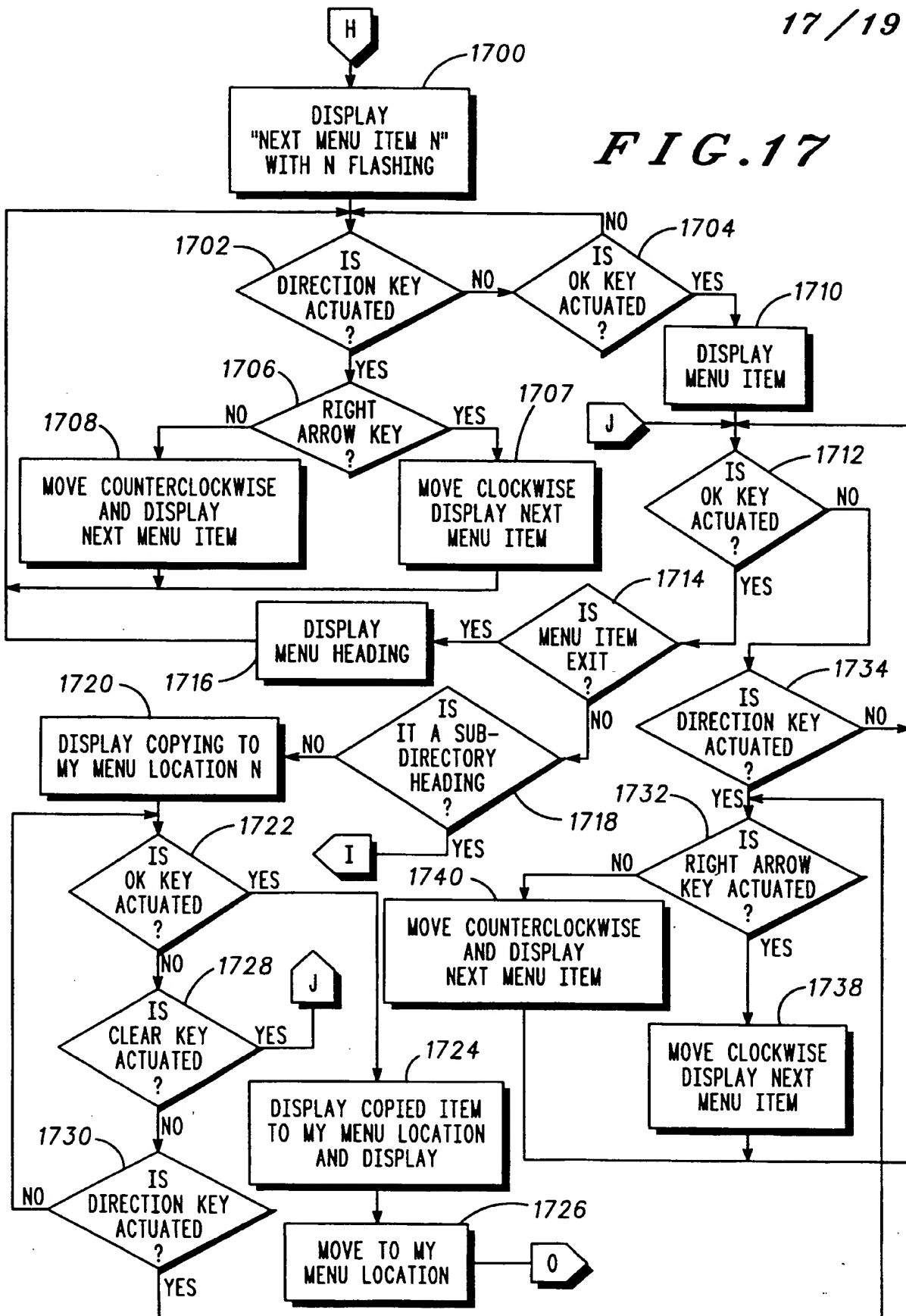
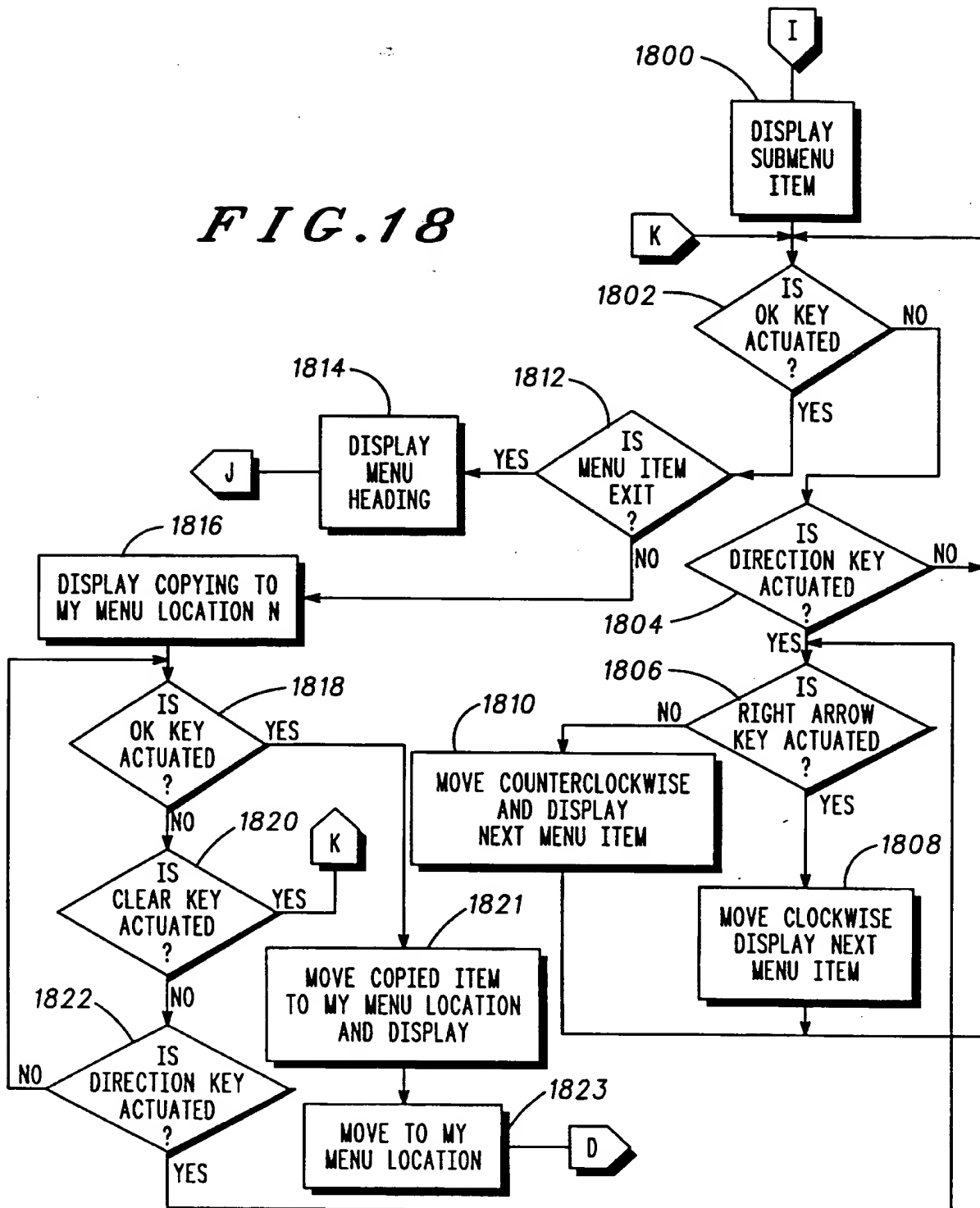


FIG. 18



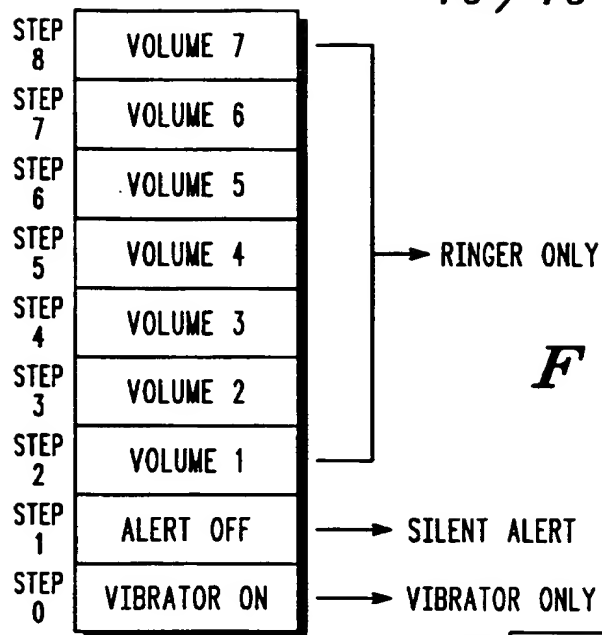


FIG. 21

FIG. 22

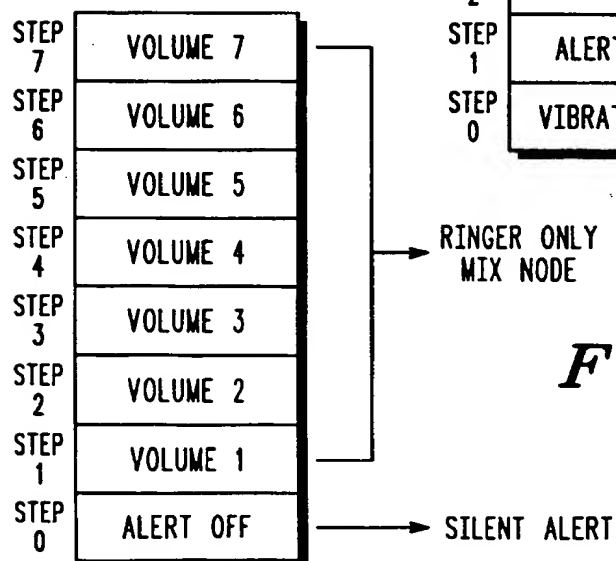
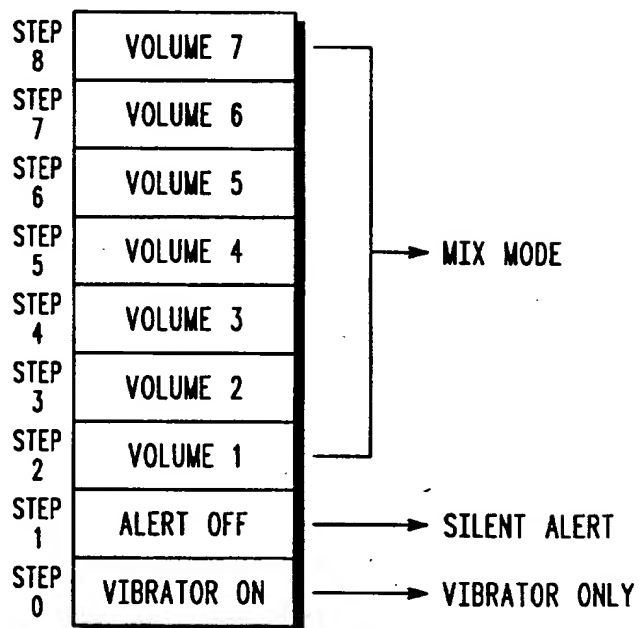


FIG. 23

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Menu System

Abstract of the Disclosure

- 5 A portable device (100) includes a display (108) which displays menu information. The menu information includes a plurality of screens which are sequentially displayed in a user definable order.